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The taxonomic position of *Antrogonodesmus* (Polydesmida: Chelodesmidae: Chondrodesmini)

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ABSTRACT

The re-examination of specimens of *Antrogonodesmus curiosus* suggests that this previously unplaced genus is referable to the tribe Chondrodesmini despite the lack of any insights how its ancestral stock arrived at a site so distant from the distributional center of the taxon.

From the time of its original description in 1959, the monotypic genus *Antrogonodesmus* has been recognized as a distinctly alien element in the milliped fauna of Cuba. The inaugural commentary about the genus stated its differences from two other confamilial Cuban taxa (*Amphelicton* and *Cubodesmus*), and emphasized the singular deep apical cavity of the gonopod prefemur from which the generic name was derived. But while no lines of obvious affinity elsewhere in the Chelodesmidae were identified, several possibilities were denied and *Antrogonodesmus* started life a mystery.

Although personal familiarity with "mainland" chelodesmids has increased greatly during the past 45 years, and substantial progress realized in the definition of tribes in the Neotropical fauna, the Antillean components have been essentially neglected. My 1980 *Classification* referred them without comment to the category "Chelodesmine genera not yet assigned to tribe" and two decades later the *Checklist of the millipeds of North and Middle America* (1999) simply repeated that evasion slightly reworded: "Chelodesmid genera without tribal assignment."

Recently, a fortuitous encounter with the "*Antrogonodesmus* problem" redirected my attention to this loose end, and the probability that, with today's much better knowledge of chelodesmid classification, surely this genus can be associated with some other taxon, somewhere. With the advantage of additional information, I believe that a reasonably correct solution can be achieved.

Family Chelodesmidae Cook

Despite the numerous chelodesmid tribes that have been recognized in recent decades, both published and still in manuscript form, no assortment of these groups into subfamilies has been proposed beyond the traditional and surely unsatisfactory dichotomy of a Neotropical nominate subfamily and an Afrotropical equivalent, the Prepodesminae. I suspect that several subfamilies based on hitherto unsuspected apomorphies will represent the eventual resolution.

Tribe Chondrodesmini Hoffman

Chondrodesmini Hoffman, 1978, Rev. Suisse zool., 85: 453; 1997, Myriapodologica, 5: 6.

In describing *A. curiosus*, I specifically excluded *Chondrodesmus* as a possible relative, as the result of actually knowing very little about that genus and its relationships. Two decades later, in defining the new tribe Chondrodesmini, I was able to include not only the type genus but four others: *Chondrodesmus* with about 40 nominal species, *Leptherpum* with seven, *Iphyria* with two, and *Eumastostethus* and *Raima* with one each. In 1997, I increased the membership of the tribe to six genera with the proposal of the monotypic *Alyssa*. As so constituted, the Chondrodesmini occupies a discrete geographic range, north of the Amazon River and as far north as Guerrero (Fig. 9). Inevitably, as any monobasic taxon is enlarged its initial homogeneity is compromised by the characters of the additional components, and the Chondrodesmini thus came to include a fair diversity of structure while maintaining the original diagnostic traits. I believe that in its present expanded context the tribe can readily accommodate *Antrogonodesmus*, as explained in a following paragraph.

KEY TO GENERA OF CHONDRODESMINI

1. Anterior legs of males with small apicoventral tibial pads; distal elements of gonotelopodite reduced in size relative to prefemoral region, latter notably broadened and with a conspicuous apical cavity
. . . . . *Antrogonodesmus*

- Anterior legs of males without tibial pads; distal elements of telopodite not evidently condensed and prefemur without lateral apical cavity 2

2. Limbus evidently fringed and/or setose; prefemoral process of gonopod broadly expanded into a large laminate shield with a basal branch on the median side 3
- Limbus broad but unmodified, neither fringed nor setose; prefemoral process not in the form of a broad concave shield 4

3. Anterior sterna of males with large, bilobed paramedian processes;prefemoral process of gonopod with a small laminate secondary lobe adjacent to telopodite; margin of face with labrogenal offset . . . . . *Eumastostethus*
- Anterior sterna of males unmodified; prefemoral process of gonopod lacking laminate process, facial margin without labrogenal offset . . . . . *Leptherpum*

4. Coxae of gonopods not notably prolonged distolaterad beyond base of telopodite; dorsal side of coxae with numerous long setae . . . . . *Chondrodesmus*

- Coxae of gonopods slightly to considerably prolonged laterally adjacent to base of telopodite; dorsal side of coxae with one to three or four setae 5

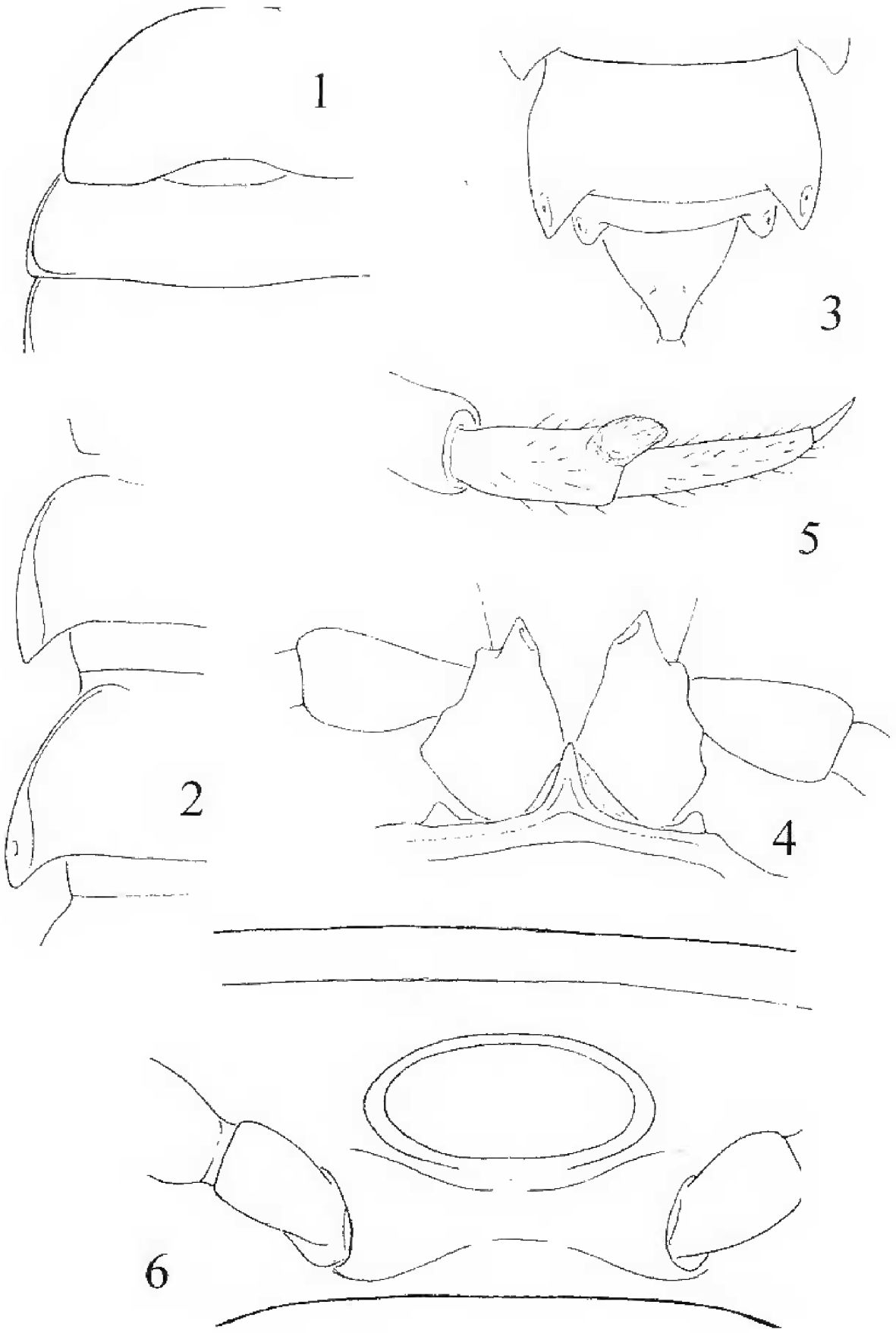
5. Coxal apophysis long and slender, extending nearly to apex of coxa . . . *Raima*
Coxal apophysis much shorter 6

6. Prefemora of legs with apicoventral spine; sterna, coxae, and prefemora setose; hypoproct with elongate median projection; coxa of gonopod projecting beyond base of telopodite on lateral side; telopodite not reflexed . . . . . *Iphyria*
- Prefemora without distal spine; sterna, coxae, and prefemora glabrous; hypoproct not prolonged medially; gonopod coxa not projecting beyond base of telopodite on lateral side; telopodite strongly reflexed . . . . . *Alyssa*

Antrogonodesmus.

Antrogonodesmus Hoffman, 1959, Journ. Washington Acad. Sci. 49: 284 Proposed with a new species. Type species: *A. curiosus* Hoffman, by original designation and monotypy.

As implied by the name itself, this genus was based primarily on the deep cavity in the lateral surface of the gonopod prefemur, but characters almost as distinctive include the enlargement of the entire prefemoral region, and notable reduction in size of the more distal elements. The conspicuous coxal apophysis is a feature not present in any other Antillean chelodesmid genus, but is one of the traits originally cited as diagnostic for the Chondrodesmini. While it is true that small tibial pads occur as an autapomorphy of *A. curiosus*, these are not as dramatic a departure from the



Figs. 1-6. *Antrogonodesmus curiosus* Hoffman, peripheral structure details. 1. Left side of collum and paranota 2 and 3, dorsal. 2. Left paranota of segments 11 and 12, dorsal. 3. Segments 18-20, dorsal. 4. Coxae and prefemora of 2nd pair of legs of male, aboral aspect. 5. Tibia and tarsus of anterior leg of male, showing the rudimentary apical tibial pad. 6. Ventral surface of 7th segment of male, showing relative size and shape of gonopod aperture and its separation from the stricture.

chondrodesmine groundplan as are, for instance, the sternal modifications in *Eumastostethus*.

I believe that placement of the genus within the Chondrodesmini is supported by the general body form, small gonopod aperture, reduced size of the gonopods themselves (not extending beyond segment 7), and dorsal gonocoxal apophysis. Similarities (homologies) in gonopod structure, not always easy to verbalize, are nonetheless apparent as shown in Figures 7 and 8.

One possible objection to the proposed allocation is biogeographic. The center of chondrodesmine diversity is clearly the northern part of South America (Peru to Amapa), and currently only the single genus *Chondrodesmus* extends northward through Central America. While the phylogeny of the tribe has not yet been established, it seems clear that *Chondrodesmus* is neither the sister-group for *Antrogonodesmus* nor a probable stem ancestor. By what route did that ancestral clade arrive at Cuba, leaving no existing trace of its progression? From Mesamerica, earlier than the arrival of *Chondrodesmus*? I provide herein (Fig. 9) a map showing the known distribution of the tribe to emphasize the modern disjunction of the Cuban species. The peripheral location of the various small "satellite" genera, relative to the the extensive range occupied by *Chondrodesmus* itself, is noteworthy.

Since the known collection sites for *A. curiosus* appear to be natural habitats, there is no reason to suspect anthropogenic introduction of the species into Cuba from a South American source area, not, at least, until *curiosus* or a very close relative is discovered there.

Antrogonodesmus curiosus Hoffman
Figs. 1-7

Antrogonodesmus curiosus Hoffman, 1959, Journ. Washington Acad. Sci., 49: 285, figs. 1-4. Male holotype (USNM 2581) from San Vicente, Pinar del Rio, Cuba. – Hoffman, 1999, *Checklist*, p. 284.

Although the original description is adequately detailed, it seems desirable to provide some drawings of peripheral characters (Figs. 1-6). A gonopod is also illustrated (Fig. 7) to show basic correspondence of the distal processes with those in the Ecuadorian species *Alyssa kalobata* (Brolemann).

The body form (in preserved material) is slender, the paranota only moderate in size and in close contact only at anterior end of the body (Fig. 1). Midbody paranota widely separated, the anterior corners reduced to an arcuate curve (Fig. 2). Ozopores opening on an oval marginal peritreme.at caudolateral corner of paranota..

Gonopores opening at apex of a short conical gonapophysis on the 2nd coxa (Fig. 4). Anterior sterna without processes. Tibiae of legs 1 to 8 with small apicoventral

pads (Fig. 5). Gonopod aperture of 7th segment small, transversely oval, not as wide as intercoxal space and not displacing line of stricture midventrally (Fig. 6), resembling that of *Chondrodesmus* in shape and relative size.

Gonopods (Fig. 7) likewise greatly reduced in size, not attaining anterior edge of stricture; coxa slightly flattened, with prominent apophysis on distal edge; prefemora broadened ventrad, with prominent deep apical cavity on lateral side (not visible in Fig. 7); distal elements of telopodite notably shortened, solenomere reflexed into cavity formed by the bilobed ?prefemoral process (b+c) and spatulate lamina (d) on ventral side. .

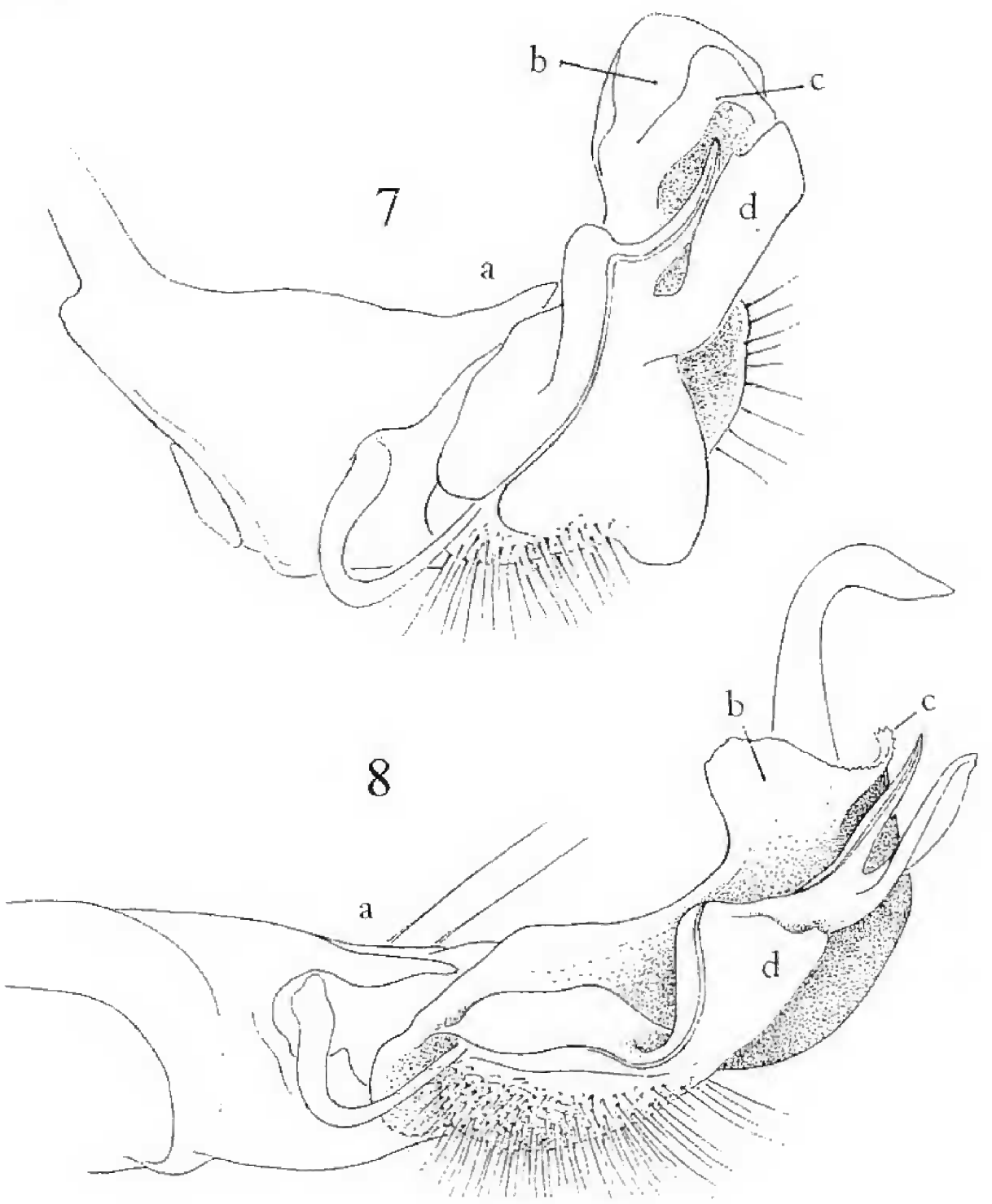


Fig. 7. *Antrogonodesmus curiosus*, left gonopod, slightly oblique ventromesal aspect.
Fig. 8. *Alyssa kalobata*, left gonopod, mesal aspect, showing corresponding elements (a-d), the process at midlength of solenomere is an autapomorphy for this genus.

Fig. 9. Central America, the Greater Antilles, and northern South America, showing the approximate distribution of the seven genera of Chondrodesmini. The dashed line encloses the range of *Chondrodesmus,* to which the other genera are distinctly peripheral.

In addition to the type locality, I have examined (VMNH) specimens from several sites in *Pinar del Rio*: 1♂ Rancho Mundito, 30 April 1953; 1♂ Sierra de los Acpstas [*sic*], 3 May 1953; 1 ♂ Los Arenas, May 1959, all Luis Lazo legit.

Although the word "Acpstas" does not exist in Spanish, the label is very clearly lettered in pencil and the exact spelling is transcribed here. Perhaps it had some meaning to the collector, or may have been a misliteration of an illegible map name. In any event, the province is clearly specified on the label.

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